

How to read the shop manual

- Some attachments and optional parts in this shop manual may not be delivered to certain areas. If one of them is required, consult KOMATSU distributors.
- Materials and specifications are subject to change without notice.
- Shop manuals are divided into the “Chassis volume” and “Engine volume”. For the engine unit, see the engine volume of the engine model mounted on the machine.

Composition of shop manual

This shop manual contains the necessary technical information for services performed in a workshop. For ease of understanding, the manual is divided into the following sections.

00. Index and foreword

This section explains the shop manuals list, table of contents, safety, and basic information.

01. Specification

This section explains the specifications of the machine.

10. Structure, function and maintenance standard

This section explains the structure, function, and maintenance standard values of each component. The structure and function sub-section explains the structure and function of each component. It serves not only to give an understanding of the structure, but also serves as reference material for troubleshooting. The maintenance standard sub-section explains the criteria and remedies for disassembly and service.

20. Standard value table

This section explains the standard values for new machine and judgment criteria for testing, adjusting, and troubleshooting. This standard value table is used to check the standard values in testing and adjusting and to judge parts in troubleshooting.

30. Testing and adjusting

This section explains measuring instruments and measuring methods for testing and adjusting, and method of adjusting each part. The standard values and judgment criteria for testing and adjusting are explained in Testing and adjusting.

40. Troubleshooting

This section explains how to find out failed parts and how to repair them. The troubleshooting is divided by failure modes.

50. Disassembly and assembly

This section explains the special tools and procedures for removing, installing, disassembling, and assembling each component, as well as precautions for them. In addition, tightening torque and weight of components are also explained.

90. Diagrams and drawings

This section gives hydraulic circuit diagrams and electrical circuit diagrams.

Revision and distribution

Any additions, revisions, or other change of notices will be sent to KOMATSU distributors. Get the most up-to-date information before you start any work.

Precautions for performing repairs

NOTE: Only qualified maintenance personnel who understand the systems being repaired should attempt repairs. Only a qualified operator should move the truck under its own power in the repair facility or during road testing after repairs are complete.

- Many components on the Komatsu truck are large and heavy. Ensure that lifting equipment (hoists, slings, chains, and lifting eyes) are of adequate capacity to handle the load.
- Do not work under a suspended load. Do not work under a raised body unless body retention sling, props or pins are in place to hold the body in the raised position.
- Do not repair the truck while the engine is running, except when adjustments can only be made under such conditions. Keep a safe distance from moving parts.
- When servicing any air conditioning system with refrigerant, wear a face shield and cold resistant gloves for protection against freezing. Follow all current regulations for handling and recycling refrigerants. Refer to Testing and adjusting section **Cab air conditioning**.
- Follow package directions carefully when using cleaning solvents.
- If an auxiliary battery assist is needed, refer to "Starting with jumper cables" or "Jump starting with receptacles" earlier in this section.
- If the truck must be towed, use a rigid tow bar. Check the truck frame for a decal recommending special towing precautions. Also refer to the towing instructions in the Operation & Maintenance Manual.
- Relieve hydraulic pressure before disconnecting any lines or hoses. Hydraulic oil escaping under pressure can have sufficient force to enter a person's body by penetrating the skin, resulting in serious injury and possibly death.
- After adjustments or repairs, replace all shields, screens and clamps.

Engine shutdown procedure after AC drive system failure

If the AC drive system is operating normally when the engine is shut down, the system should be safe to service. However, in the event of a drive system failure, performing the following procedure before any maintenance activities will ensure that no hazardous voltages are present in the AC drive system.

1. Before shutting down the engine, verify the status of all the drive system warning lights. Use the lamp test switch to verify that all lamps are functioning properly.

If any of the red drive system warning lights remain on, do not attempt to open any cabinets, disconnect any cables, or reach inside the retarding grid cabinet without a trained drive system technician present, even if the engine is off. Only qualified personnel, specifically trained for servicing the AC drive system, should perform this service.

2. If all red drive system warning lights are off, follow the normal engine shutdown procedure in the Operation & Maintenance Manual.
3. After the engine has been stopped for at least five minutes, inspect the link voltage lights on the exterior of the main control cabinet and the VID panel on the rear wall of the operator cab.
 - a. If all lights are off, it is safe to work on the retarding grids, wheel motors, alternator and related power cables. Proceed to Step 5.
 - b. If any red lights continue to be illuminated after following the above procedure, a fault has occurred. Leave all cabinet doors in place. Do not touch the retarding grid elements. Do not disconnect any power cables or use them as hand or foot holds. Notify your Komatsu service representative immediately.
4. Locate the generator field contactor (GF) switch in the access panel on the left side of the main control cabinet. Place the switch in the CUTOFF position. This will prevent the alternator from re-energizing and creating system voltage until the switch is returned to its former position.
5. Leave the drive system in the rest mode until the truck is to be moved.

Precautions for welding on the truck

NOTE: Before welding or repairing an AC drive truck, notify a Komatsu service representative. Only qualified personnel, specifically trained for servicing the AC drive system, should perform this service.

If it is necessary to perform welding on the truck without the field engineer present, the following procedures and precautions must be followed to ensure that the truck is safe for maintenance personnel to work on and to reduce the chance for damage to equipment.

- Before opening any cabinets or touching a retarding grid element or a power cable, the engine must be shutdown and any red drive system warning lights must not be illuminated.
- Always disconnect the positive and negative battery cables of the truck before doing any welding on the unit. Failure to do so may seriously damage the battery and electrical equipment. Disconnect the battery charging alternator lead wire and isolate the electronic control components before making welding repairs. (It is not necessary to disconnect or remove any control circuit cards on electric drive dump trucks or any of the AID circuit control cards.)
- Always fasten the welding machine ground (-) lead to the piece being welded. The grounding clamp must be attached as near as possible to the weld area. Never allow welding current to pass through ball bearings, roller bearings, suspensions or hydraulic cylinders. Always avoid laying welding cables over or near the vehicle electrical harnesses. Welding voltage could be induced into the electrical harness and possibly cause damage to components.
- Drain, clean, and ventilate fuel tanks and hydraulic tanks before making any welding repairs on the tanks.
- Before welding on the truck, disconnect all electrical harnesses from the modules and controllers inside the auxiliary control cabinet behind the operator cab.
- **Do not weld on the rear of the control cabinet!** The metal panels on the back of the cabinet are part of capacitors and cannot be heated.
- **Do not weld on the retarding grid exhaust louvers!** They are made of stainless steel. Some power cable panels throughout the truck are also made of aluminum or stainless steel. They must be repaired with the same material or the power cables may be damaged.
- Power cables must be cleated in wood or other non-ferrous materials. Do not repair cable cleats by encircling the power cables with metal clamps or hardware. Always inspect power cable insulation before servicing the cables and returning the truck to service. Discard cables with broken insulation.
- Power cables and wiring harnesses should be protected from weld spatter and heat.
- Always fasten the welding machine ground (-) lead to the piece being welded. The grounding clamp must be attached as near as possible to the weld area.
- Always avoid laying welding cables over or near the vehicle electrical harnesses. Welding voltage could be induced into the electrical harness and cause damage to components.
- Before doing any welding on the truck, disconnect the battery charging alternator lead wire and isolate electronic control components.
- Also, always disconnect the negative and positive battery cables of the vehicle. Failure to do so may seriously damage the battery and electrical equipment.
- Never allow welding current to pass through ball bearings, roller bearings, suspensions or hydraulic cylinders.

Precautions for disposing of DEF

- When disposing of DEF, treat both the fluid and the container as industrial waste.
- Never use a container made of iron or aluminum when disposing of DEF. Toxic gas may develop and a chemical reaction may corrode the container. Use a container made of resin (PP, PE) or stainless steel when handling the fluid waste of DEF.
- White powder (crystallized urea) may cover the exhaust pipe outlet of aftertreatment devices. When you wipe off the covered materials, discard the crystallized urea and the used cloth as industrial waste.

Crystallization management

Over time, DEF can crystallize in the system, causing clogging and component damage. Crystallization occurs when the water in DEF evaporates, leaving only urea crystals. Crystallization can be minimized by limiting the introduction of fresh air into the DEF system as much as possible.

Use distilled water (double-distilled water if available) to clean any components that have crystallization, or replace the components.

Precautions for cold weather operation

DEF freezes at -11°C (12°F). When the outside temperature is below -11°C (12°F) and the truck is not in use, it is recommended to leave the truck idling. This will prevent damage to the aftertreatment system components due to DEF freezing.

If the truck will be parked and shut down for more than 24 hours in temperatures below -11°C (12°F):

1. Drain or fill the DEF tank completely. The tank must be completely empty or filled to 100% capacity to prevent damage to the internal components.
2. Disconnect the DEF hoses from the tank head units (top of tank), dosing pumps (bottom of tank), and dosing valves and allow to drain into an approved container. The hoses only need to gravity drain at this step. The drained fluid should be disposed of according to local standards.
3. Reconnect all the hoses that have been previously disconnected. Ensure that the hoses and fittings are clean and free from debris before reconnecting.
4. If the DEF tank has been drained, appropriately identify the truck as inoperable to prevent accidental startup of the engine which could damage components of the DEF system. A tag or notification on the steering wheel or windshield is recommended.

If the truck will be stored for an extended time period in temperatures below -11°C (12°F):

1. Drain DEF from DEF tank and aftertreatment DEF dosing system components.
2. Clean inside of the DEF tank to remove any contaminants.
3. Consult your engine service representative for further preparation instructions.

If the truck has been shut down for an extended period of time without properly preparing the DEF system, inspect the head units, hoses, and fittings for evidence of leaks and damage from freezing before returning the truck to operation.

Bleeddown manifold

Bleeddown manifold (5, Figure 10-1) is located on the outside of the left frame rail just behind the accumulators.

The bleeddown manifold receives oil from the steering/brake pump through a high pressure filter and directs oil to the steering accumulators, flow amplifier, brake apply circuit, and the auxiliary system. The manifold also provides hoist circuit control when the body is raised.

Relief valve (4, Figure 10-3) limits the hydraulic supply pressure to the steering and brake circuits to 27 500 kPa (4,000 psi). Relief valve (3) provides maximum pressure protection of 4 100 kPa (600 psi) for the oil returning to the hydraulic tank.

NOTE: The relief valves, steering accumulator bleeddown solenoid, and hoist up limit solenoid are factory preset and cannot be individually rebuilt.

Steering accumulator bleeddown solenoid

Each time the engine start switch is turned OFF with the truck stopped, steering accumulator bleeddown solenoid (2, Figure 10-3) is energized. When the solenoid is energized, all hydraulic steering pressure (including the accumulators) is bled back to the hydraulic tank. Brake pressure, however, will not bleeddown due to internal check valves in the brake manifold and bleeddown manifold.

After approximately 90 seconds, the solenoid will de-energize to close the return port to the hydraulic tank. By this time, all the oil in the accumulators should be returned to the hydraulic tank. At startup, the steering circuit and brake circuit will be charged. Steering system pressure switch (10, Figure 10-3) will activate a low steering pressure warning until steering pressure reaches 15 858 kPa (2,300 psi).

If steering pressure falls below 15 858 kPa (2,300 psi) during operation, the low steering pressure warning will be activated until pressure returns to normal.

Quick disconnect ports

Two quick disconnect ports on the bleeddown manifold allow service personnel to connect an external hydraulic supply to allow operation of the truck steering and service brakes if the steering/brake pump or engine is not operational.

The external supply is connected to port (5, Figure 10-2) and the return is connected to port (6) on top of the bleeddown manifold. This feature should only be used for an emergency to allow operation of the truck to return to the shop for service or to move the truck out of haul road traffic.

Flow amplifier

Flow amplifier (4, Figure 10-1), located on the left frame rail in front of the accumulators, provides the steering circuit with the high volume of oil required for the steering cylinders.

The flow amplifier uses the amount of flow from the steering control unit to determine a proportional amount of flow to send from the bleeddown manifold to the steering cylinders.