Shop Manual

CEBM036503

930E-5

DUMP TRUCK

SERIAL NUMBERS **930E-5** **A40216 - A40329**

KOMATSU

DUMP TRUCK

930E

Machine model	Serial number
930E-5	A40216 and up

00 Index and foreword

Index

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 module (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.

Section Title	Form Number
Shop Manual, contents binder, binder label and tabs	CEBM036503
00 Index and foreword	
Index	CEN00067-03 ●
Foreword, safety and general information	CEN00038-07
01 Specification	
Specification and technical data	CEN01018-03
10 Structure and functions	
Steering circuit	CEN10077-01 ●
Hoist circuit	CEN10078-00
Brake circuits	CEN10079-01
Electrical system, 24 volt	CEN10109-02 ●
Cab air conditioning	CEN10088-01
Automatic lubrication (auto lube) system	CEN10080-00
Engine emissions aftertreatment system	CEN10108-00
20 Standard value table	
Standard value table	CEN20007-00
30 Testing and adjusting	
Steering, brake cooling and hoist hydraulic system	CEN30087-02
Brake system	CEN30088-02
Accumulators and suspensions	CEN30098-16 ●
Electrical systems	CEN30102-04 ●
Interface module 2 (IM2)	CEN30125-04 ●
Payload meter IV	CEN30070-05
KOMTRAX Plus II	CEN30091-02 ●
Komatsu Wireless Bridge (KWB)	CEN30101-00

Table of contents

NOTES

DUMP TRUCK

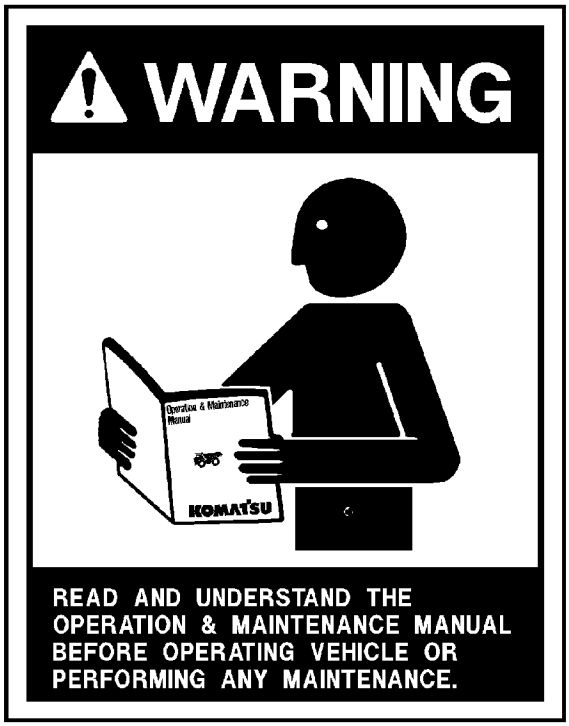
830E
930E

Machine model	Serial number
830E-5	A50005 and up
830E-5AT	A50005 and up
930E-5	A40004 and up
930E-5AT	A40004 and up
930E-5SE	A50001 and up

00 Index and foreword
Foreword, safety and general information

It is the policy of the Company to improve products whenever it is possible and practical to do so. The Company reserves the right to make changes or add improvements at any time without incurring any obligation to install such changes on products sold previously.

Because of continuous research and development, periodic revisions may be made to this publication. Customers should contact their local Komatsu distributor for information on the latest revision.



Unsafe use of this machine may cause serious injury or death. Operators and maintenance personnel must read and understand this manual before operating or maintaining this machine.

This manual should be kept in or near the machine for reference, and periodically reviewed by all personnel who will come into contact with it.

CALIFORNIA
Proposition 65 Warning

Diesel engine exhaust, some of its constituents, and certain vehicle components contain or emit chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

CALIFORNIA
Proposition 65 Warning

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.

CALIFORNIA
Proposition 65 Warning

Mercury and mercury compounds are known to the State of California to cause developmental problems. This machine may be equipped with optional HID lamps which contain mercury. There is no risk of exposure unless the lamps are broken. However, the lamps must be reused, recycled or properly disposed of in accordance with Local, State and Federal Laws at the end of their useful lives.

⚠WARNING

NON-OEM PARTS IN CRITICAL SYSTEMS

For safety reasons, Komatsu America Corp. strongly recommends against the use of non-OEM replacement parts in critical systems of all Komatsu equipment. Critical systems include but are not limited to steering, braking and operator safety systems.

Replacement parts manufactured and supplied by unauthorized sources may not be designed, manufactured or assembled to Komatsu's design specifications; accordingly, use of such parts may compromise the safe operation of Komatsu products and place the operator and others in danger should the part fail.

Komatsu is also aware of repair companies that will rework or modify an OEM part for reuse in critical systems. Komatsu does not generally authorize such repairs or modifications for the same reasons as noted above.

Use of non-OEM parts places full responsibility for the safe performance of the Komatsu product on the supplier and user. Komatsu will not in any case accept responsibility for the failure or performance of non-OEM parts in its products, including any damages or personal injury resulting from such use.

Foreword

This manual is written for use by the operator and/or the service technician. It is designed to help these persons to become fully knowledgeable of the truck and all of its systems in order to keep it operating safely and efficiently. All operators and maintenance personnel should read and understand the information in this manual before operating the truck or performing maintenance and/or operational checks on the truck. All safety notices, warnings, and cautions should be understood and followed when operating the truck or performing repairs on the truck.

The first section covers component descriptions, truck specifications and safe work practices, as well as other general information. The major portion of the manual pertains to disassembly, service and reassembly. Each major serviceable area is dealt with individually. For example, the disassembly, service and reassembly of the radiator group is discussed as a unit. The same is true of the engine and engine accessories, and so on through the entire mechanical detail of the truck. Disassembly should be carried only as far as necessary to accomplish needed repairs.

The illustrations used in this manual are *typical* of the component shown and may not be an *exact* reproduction of what is found on the truck.

This manual shows dimensioning of U.S. standard and metric (SI) units throughout. All references to “right,” “left,” “front,” or “rear” are made with respect to the operator's normal seated position unless specifically stated otherwise.

When assembly instructions are provided without references to specific torque values, standard torque values should be used. Standard torque values are shown in torque charts later in this section. Specific torques, when provided in the text, are in bold face type, such as **135 N·m (100 ft lb)**. All torque specifications have ±10% tolerance unless otherwise specified.

A product identification plate is located on the frame in front of the right side front wheel. It designates the Truck Model Number, Product Identification Number (vehicle serial number), and Maximum GVW (Gross Vehicle Weight) rating.

The KOMATSU truck model designation consists of three numbers and one letter (i.e. 960E).

The three numbers represent the basic truck model.

The letter “E” designates an Electrical wheel motor drive system.

The Product Identification Number (vehicle serial number) contains information which identifies several characteristics of this unit. For a more detailed explanation, refer to the Operation and Maintenance Manual.

The Gross Vehicle Weight (GVW) is what determines the load on the drive train, frame, tires, and other components. The vehicle design and application guidelines are sensitive to the maximum GVW.
GVW is *total weight*: **empty vehicle weight + fuel & lubricants + payload.**

To determine the *allowable payload*, fill all lubricants to the proper level and fill the fuel tank of an empty truck (which includes all accessories, body liners, tailgates, etc.), and then weigh the truck. Record this value and subtract it from the GVW. The result is the allowable payload.

NOTE: Accumulations of mud, frozen material, etc, become part of the GVW and reduces the allowable payload. To maximize payload and to keep from exceeding the maximum GVW rating, these accumulations should be removed as often as practical.

Exceeding the allowable payload will reduce the expected life of truck components.

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.

Symbols

This "ALERT" symbol is used with the signal words, "DANGER", "WARNING", and "CAUTION" in this manual to alert the reader to hazards arising from improper operating and maintenance practices.

DANGER

"DANGER" identifies a specific potential hazard WHICH WILL RESULT IN EITHER INJURY OR DEATH if proper precautions are not taken.

WARNING

"WARNING" identifies a specific potential hazard WHICH MAY RESULT IN EITHER INJURY OR DEATH if proper precautions are not taken.

CAUTION

"CAUTION" is used for general reminders of proper safety practices OR to direct the reader's attention to avoid unsafe or improper practices which may result in damage to the equipment.

General safety

Safety records from most organizations will show that the greatest percentage of accidents are caused by unsafe acts performed by people. The remainder are caused by unsafe mechanical or physical conditions. Report all unsafe conditions to the proper authority.

The following safety rules are provided as a guide for the operator. However, local conditions and regulations may add many more to this list.

⚠WARNING

Read and follow all safety precautions. Failure to do so may result in serious injury or death.

Safety rules

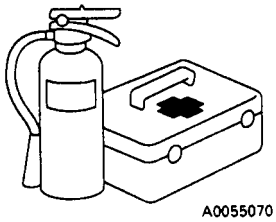
- Only trained and authorized personnel may operate and maintain the truck.
- Follow the local safety statutes and laws when working with electrical components.
- Follow all safety rules, precautions and instructions when operating or performing maintenance on the truck.
- When working with another operator or a person on work site traffic duty, make sure that all personnel understand all hand signals that are to be used.

Safety features

- Make sure that all guards and covers are in their proper position. Have any damaged guards and covers repaired.
- Learn the proper use of safety features such as safety locks, safety pins, and seat belts. Use these safety features properly.
- Never remove any safety features. Always keep them in good operating condition.
- Improper use of safety features could result in serious bodily injury or death.
- Check the seat belt fabric, buckle and hardware for damage or wear. Replace any worn or damaged parts immediately.
- The seat belts must be replaced 5 years after seat belt manufacture, or after every 3 years of use, whichever comes first.

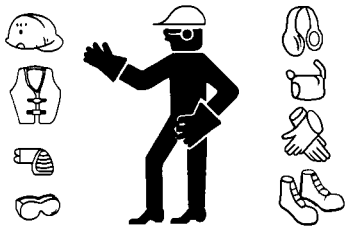
Fire extinguisher and first aid kit

- Make sure that fire extinguishers are accessible and proper usage techniques are known.
- Provide a first aid kit at the storage point.
- Know what to do in the event of a fire.
- Keep the phone numbers of persons you should contact in case of an emergency on hand.


A0055070

Clothing and personal items

- Avoid loose clothing, jewelry, and loose long hair. They can catch on controls or in moving parts and cause serious injury or death. Also, never wear oily clothes as they are flammable.
- Wear a hard hat, safety glasses, safety shoes, mask and gloves when operating or maintaining a truck. Always wear safety goggles, hard hat and heavy gloves if your job involves scattering metal chips or minute materials, particularly when driving pins with a hammer or when cleaning air cleaner elements with compressed air. Also, ensure that the work area is free from other personnel during such tasks.


A0055010

Leaving the operator seat

When preparing to leave the operator's seat, do not touch any control lever that is not locked. To prevent accidental operations from occurring, always perform the following:

- Move the directional control lever to PARK. **Do not use the wheel brake lock when the engine will be turned off.**
- Lower the dump body to the frame.
- Stop the engine. When exiting the truck, always lock compartments and take the keys with you. If the truck should suddenly move or move in an unexpected way, this may result in serious bodily injury or death.

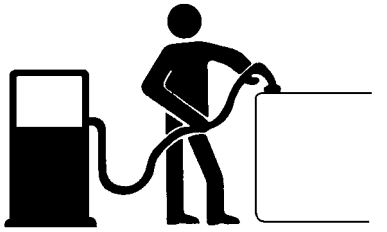
Mounting and dismounting

- Use the handrails and steps when getting on or off the truck.
- Never jump on or off the truck. Never climb on or off a truck while it is moving.
- When climbing on or off a truck, face the truck and use the hand-hold and steps.
- Never hold any control levers when getting on or off a truck.
- Always maintain three-point contact with the hand-holds and steps to ensure that you support yourself.
- When bringing tools into the operator's compartment, always pass them by hand or pull them up by rope.
- If there is any oil, grease, or mud on the hand-holds or steps, wipe them clean immediately. Always keep these components clean. Repair any damage and tighten any loose bolts.

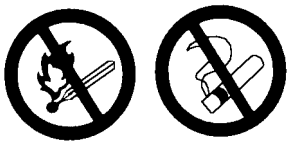
Fire prevention for fuel and oil

- Fuel, oil, and antifreeze can be ignited by a flame. Fuel is extremely flammable and can be hazardous. Keep flames away from flammable fluids.
- Keep oil and fuel in a designated location and do not allow unauthorized persons to enter.
- When refueling, stop the engine and do not smoke.
- Refueling and oiling should be done in well ventilated areas.
- Tighten all fuel and oil tank caps securely.

A0055020



A0055030



A0055040

Precautions with high temperature fluids

Immediately after truck operation, engine coolant, engine oil, and hydraulic oil are at high temperatures and are pressurized. If the cap is removed, the fluids are drained, the filters are replaced, etc., there is danger of serious burns. Allow heat and pressure to dissipate before performing such tasks and follow proper procedures as outlined in the service manual.


A0055050

To prevent hot coolant from spraying:

1. Stop the engine.
2. Wait for the coolant temperature to decrease.
3. Depress the pressure release button on the cap to vent cooling system pressure.
4. Turn the radiator cap slowly to release the pressure before removing.

To prevent hot engine oil spray:

1. Stop the engine.
2. Wait for the oil temperature to cool down.
3. Turn the cap slowly to release the pressure before removing the cap.

Asbestos dust hazard prevention

Asbestos dust is hazardous to your health when inhaled. If you handle materials containing asbestos fibers, follow the guidelines below:

- Never use compressed air for cleaning.
- Use water for cleaning to control dust.
- Operate the truck or perform tasks with the wind to your back whenever possible.
- Use an approved respirator when necessary.


A0055060

Prevention of injury by work equipment

Never enter or put your hand, arm or any other part of your body between movable parts such as the dump body, chassis or cylinders. If the work equipment is operated, clearances will change and may lead to serious bodily injury or death.

Unauthorized modification

Any modification made to this vehicle without authorization from Komatsu America Corp. can possibly create hazards.

Before making any modification, consult the authorized regional Komatsu America Corp. distributor. Komatsu will not be responsible for any injury or damage caused by any unauthorized modification.

Precautions when using ROPS

The ROPS is intended to protect the operator if the truck should roll over. It is designed not only to support the load of the truck, but also to absorb the energy of the impact.

- The Rollover Protection Structure (ROPS) must be properly installed before the truck is operated.
- ROPS installed on equipment manufactured and designed by Komatsu America Corp. fulfills all of the regulations and standards for all countries. If it is modified or repaired without authorization from Komatsu, or if it is damaged when the truck rolls over, the strength of the structure will be compromised and will not be able to fulfill its intended purpose. Optimum strength of the structure can only be achieved if it is repaired or modified as specified by Komatsu.
- When modifying or repairing the ROPS, always consult your nearest Komatsu distributor.
- Even with the ROPS installed, the operator must always use the seat belt when operating the truck.

Precautions for attachments

- When installing and using optional equipment, read the instruction manual for the attachment and the information related to attachments in this manual.
- Do not use attachments that are not authorized by Komatsu America Corp. or the authorized regional Komatsu distributor. Use of unauthorized attachments could create a safety problem and adversely affect the proper operation and useful life of the truck.
- Any injuries, accidents, and product failures resulting from the use of unauthorized attachments will not be the responsibility of Komatsu America Corp. or the authorized regional Komatsu distributor.

Precautions for starting the truck

Start the engine from the operator seat only. Never attempt to start the engine by shorting across the cranking motor terminals. This may cause a fire, serious injury or death to anyone in truck's path.

Precautions before operating the truck

Safety is thinking ahead. Prevention is the best safety program. Prevent a potential accident by knowing the employer's safety requirements and all necessary job site regulations. In addition, know the proper use and care of all the safety equipment on the truck. Only qualified operators or technicians should attempt to operate or maintain a Komatsu machine.

Safe practices start before the operator gets to the equipment.

Safety at the worksite

- When walking to and from a truck, maintain a safe distance from all machines even when the operator is visible.
- Before starting the engine, thoroughly check the area for any unusual conditions that could be dangerous.
- Examine the road surface at the job site and determine the best and safest method of operation.
- Choose an area where the ground is as horizontal and firm as possible before performing the operation.
- If you need to operate on or near a public road, protect pedestrians and cars by designating a person for work site traffic duty or by installing fences around the work site.
- The operator must personally check the work area, the roads to be used, and the existence of obstacles before starting operations.
- Always determine the travel roads at the work site and maintain them so that it is always safe for the machines to travel.
- If travel through wet areas is necessary, check the depth and flow of water before crossing the shallow parts. Never drive through water that exceeds the permissible water depth.

Fire prevention

- Remove wood chips, leaves, paper, and other flammable items that have accumulated in the engine compartment. Failure to do so could result in a fire.
- Check the fuel, lubrication, and hydraulic systems for leaks. Repair any leaks. Clean any excess oil, fuel or other flammable fluids, and dispose of them properly.
- Make sure that a fire extinguisher is present and in proper working condition.
- Do not operate the truck near open flames.

A0055020

Ventilation in enclosed areas

If it is necessary to start the engine within an enclosed area, provide adequate ventilation. Inhaling exhaust fumes from the engine can kill.

A0055060

Preparing for operation

- Always mount and dismount while facing the truck. Never attempt to mount or dismount the truck while it is in motion. Always use handrails and ladders when mounting or dismounting the truck.
- Check the deck areas for debris, loose hardware and tools. Check for people and objects that might be in the area.
- Become familiar with and use all protective equipment devices on the truck and ensure that these items (anti-skid material, grab bars, seat belts, etc.) are securely in place.

Mirrors, windows and lights

- Remove any dirt from the surface of the windshield, cab windows, mirrors and lights. Good visibility may prevent an accident.
- Adjust the rear view mirror to a position where the operator can see best from the operator's seat. If any glass or light is broken, replace it with a new part.
- Make sure that the headlights, work lights, and taillights are in proper working order. Make sure that the truck is equipped with the proper work lamps that are needed for the operating conditions.

In operator cab (before starting the engine)

- Do not leave tools or spare parts lying around. Do not allow trash to accumulate in the cab of the truck. Keep all unauthorized reading material out of the truck cab.
- Keep the cab floor, controls, steps and handrails free of oil, grease, snow and excess dirt.
- Read and understand the contents of this manual. Pay special attention to the sections pertaining to safety and operating instructions. Become thoroughly acquainted with all gauges, instruments and controls before attempting operation of the truck.
- Read and understand the **WARNING** and **CAUTION** decals in the operator's cab.
- Make sure that the steering wheel, horn, controls and pedals are free of any oil, grease or mud.
- Check the operation of the windshield wiper, condition of wiper blades, and the washer fluid reservoir level.
- Be familiar with all steering and brake system controls, warning devices, road speeds and loading capabilities before operating the truck.

Seat Belts

- On both driver and passenger seats, check the seat belt fabric, buckle, all belt retractors and hardware for damage or wear. Replace any worn or damaged parts immediately.
- Even if there are no signs of damage, replace both driver and passenger seat belts 5 years after seat belt manufacture, or every 3 years after start of use, whichever comes first. The passenger seat belt date of manufacture label is sewn into the seat belt near the buckle. The driver seat belt date of manufacture label is sewn into the shoulder harness belt, near the retractor end.

Precautions while operating the truck

When starting the engine

- Never attempt to start the engine by shorting across cranking motor terminals. This may cause a fire, or serious injury or death to anyone in truck's path.
- Never start the engine if a warning tag has been attached to the controls.
- When starting the engine, sound the horn as an alert.
- Start and operate the truck only while seated in the operator's seat.
- Do not allow any unauthorized persons in the operator's compartment or any other place on the truck.

General truck operation

- Wear the seat belt at all times.
- Only authorized persons are allowed to ride in the truck. Riders must be in the cab and belted in the passenger seat.
- Do not allow anyone to ride on the decks or steps of the truck.
- Do not allow anyone to get on or off the truck while it is in motion.
- Do not move the truck in or out of a building without a signal person present.
- Know and obey the hand signal communications between operator and spotter. When other machines and personnel are present, the operator should move in and out of buildings, loading areas, and through traffic under the direction of a signal person. Courtesy at all times is a safety precaution.
- Immediately report any adverse conditions at the haul road, pit or dump area that may cause an operating hazard.
- Check for flat tires periodically during a shift. If the truck has been operating on a "flat", do not park the truck inside a building until the tire cools. If the tire must be changed, do not stand in front of the rim and locking ring when inflating a tire mounted on the truck. Observers should not be permitted in the area and should be kept away from the side of such tires.

⚠DANGER

The tire and rim assembly may explode if subjected to excessive heat. Personnel should move to a remote or protected location if sensing excessively hot brakes, smelling burning rubber or observing evidence of fire near the tire and wheel area.

If the truck must be approached to extinguish a fire, those personnel should do so only while facing the tread area of the tire (front or back) unless protected by using large heavy equipment as a shield. Stay at least 15 m (50 ft) from the tread of the tire.

In the event of fire in the tire and wheel area (including brake fires), stay away from the truck for at least 8 hours or until the tire and wheel are cool.

- Keep serviceable fire fighting equipment on hand. Report empty extinguishers for replacement or refilling.
- Always place the directional control lever in the PARK position when the truck is parked and unattended. Do not leave the truck unattended while the engine is running.

NOTE: DO NOT use wheel brake lock when parking the truck.

- Park the truck a safe distance away from other vehicles as determined by the supervisor.
- Stay alert at all times! In the event of an emergency, be prepared to react quickly and avoid accidents. If an emergency arises, know where to get prompt assistance.

Ensuring good visibility

- When working in dark places, install work lamps and head lamps. Set up extra lighting in the work area if necessary.
- Discontinue operations if visibility is poor, such as in mist, snow, or rain. Wait for the weather to improve to allow the operation to be performed safely.

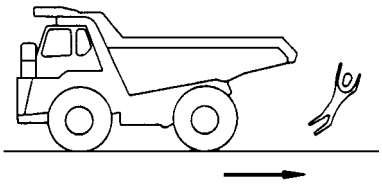
Traveling

- When traveling on rough ground, travel at low speeds. When changing direction, avoid turning suddenly.
- Lower the dump body and set the dump lever to the FLOAT position before traveling.
- If the engine stops while the truck is in motion, secondary steering and braking enable the truck to be steered and stopped. A fixed amount of reserve oil provides temporary steering and braking to briefly allow the truck to travel to a safe area. Apply the brakes immediately and stop the truck as quickly and safely as possible off of the haul road, if possible.

Traveling in reverse

Before operating the truck:

- Sound the horn to warn people in the area. Make sure that the back-up horn also works properly.
- Check for personnel near the truck. Be particularly careful to check behind the truck.
- When necessary, designate a person to watch the area near the truck and signal the operator. This is particularly necessary when traveling in reverse.
- When operating in areas that may be hazardous or have poor visibility, designate a person to direct work site traffic.
- Do not allow any one to enter the line of travel of the truck. This rule must be strictly observed even with machines equipped with a back-up horn or rear view mirror.



Traveling on slopes

- Traveling on slopes could result in the truck tipping over or slipping.
- Do not change direction on slopes. To ensure safety, drive to level ground before turning.
- Do not travel up and down on grass, fallen leaves, or wet steel plates. These materials may make the truck slip on even the slightest slope. Avoid traveling sideways, and always keep travel speed low.
- When traveling downhill, use the retarder to reduce speed. Do not turn the steering wheel suddenly. Do not use the foot brake except in an emergency.
- If the engine should stop on a slope, apply the service brakes fully and stop the truck. Move the directional control lever to PARK after the truck has stopped.

Operating on snow or ice

- When working on snowy or icy roads, there is danger that the truck may slip to the side on even the slightest slope. Always travel slowly and avoid sudden starting, turning, or stopping in these conditions.
- Be extremely careful when clearing snow. The road shoulder and other objects are buried in the snow and cannot be seen.

Avoid damage to dump body

Always be extremely cautious when working in tunnels, on bridges, under electric cables, or when entering a parking place or any other place where there are height limits. The dump body must be completely lowered before driving the truck.

Driving near high voltage cables

Do not travel or operate the machine near electric cables. There is a hazard of electric shock, which may cause serious personal injury or death. On jobsites where the machine may go near electric cables, always do the following:

- Moving close to high-voltage cables, even without touching them, can cause electric shock. This can cause serious burns or even death. Always maintain a safe distance (see the table) between the machine and the electric cable.

Voltage	Minimum Safety Distance	
50 kV or Less	3.1 m	10 ft.
50 kV to 200 kV	4.6 m	15 ft.
200 kV to 350 kV	6.1 m	20 ft.
350 kV to 500 kV	7.7 m	25 ft.
500 kV to 750 kV	10.7 m	35 ft.
750 kV to 1000 kV	13.8 m	45 ft.

- To prepare for any possible emergencies, wear rubber shoes and gloves. Lay a rubber sheet on top of the seat, and be careful not to touch the chassis with any exposed part of your body.
- Use a signalman to give warning if the machine approaches too close to the electric cables.
- When carrying out operations near high voltage cables, do not let anyone near the machine.
- If the machine comes too close or touches the electric cable, to prevent electric shock, the operator should not leave the operator's compartment until it has beeen confirmed that the electricity has been shut off. Also, do not let anyone near the machine.

When dumping

- Before starting the dumping operation, make sure that there are no persons or objects behind the truck.
- Stop the truck in the desired location. Check again for persons or objects behind the truck. Give the determined signal, then slowly operate the dump body. If necessary, use blocks for the wheels or position a flagman.
- When dumping on slopes, truck stability is poor and there is danger of tipping over. Always use extreme care when performing such operations.
- Never travel with the dump body raised.

When loading

- Make sure that the surrounding area is safe. Stop the truck in the correct loading position, then load the body uniformly.
- Do not leave the operator seat during the loading operation.

Working on loose ground

- Avoid operating the truck near cliffs, overhangs and deep ditches. If these areas collapse, the truck could fall or tip over and result in serious injury or death. Remember that ground surfaces in these areas may be weakened after heavy rain or blasting.
- Freshly laid soil and the soil near ditches is loose. It can collapse under the weight or vibration of the truck. Avoid these areas whenever possible.

Parking the truck

- Choose a flat, level surface to park the truck. If the truck has to be parked on a slope, put blocks behind all the wheels to prevent truck movement.
- Do not activate the wheel brake lock when the parking brake is activated. Bleed down of hydraulic pressure may occur, causing the truck to roll away.
- When parking on public roads, provide fences and signs, such as flags or lights, on the truck to warn pedestrians and other vehicles. Make sure that the truck, flags or lights do not obstruct traffic.
- Lower the dump body fully, move the directional control lever to PARK, stop the engine and lock everything. Always take the key with you.

Towing

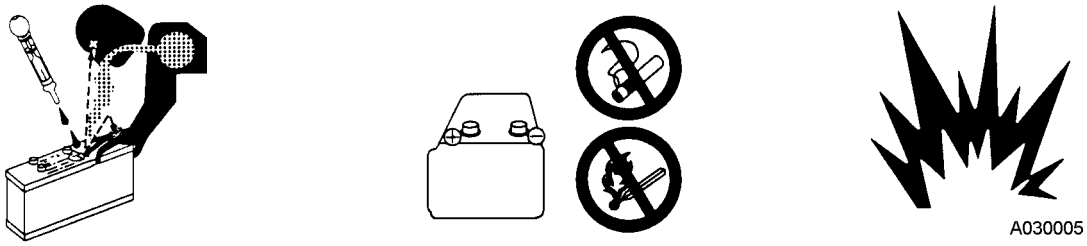
Improper towing methods may lead to serious personal injury and/or damage. For towing methods, refer to the Operation & Maintenance Manual.

- Use a towing device with ample strength for the weight of this truck.
- Towing vehicle must have adequate pulling and braking capacity to both move and stop the towed truck under all conditions, including towing on a grade.
- Inspect towing components, such as tow bars and couplings, for any signs of damage. Never use damaged or worn components to tow a disabled vehicle.
- Keep a safe distance from the trucks and towing apparatus while towing a vehicle.
- When connecting a truck that is to be towed, do not allow anyone to go between the tow vehicle and the disabled vehicle.
- Set the coupling of the truck being towed in a straight line with the towing portion of the tow truck, and secure it in position.

Working near batteries

Battery hazard prevention

- Battery electrolyte contains sulfuric acid, which can quickly burn the skin and eat holes in clothing. If you spill acid on yourself, immediately flush the area with water.
- Battery acid can cause blindness if splashed into your eyes. If acid gets into your eyes, flush them immediately with large quantities of water and see a doctor at once.
- If you accidentally drink acid, drink a large quantity of water, milk, beaten eggs or vegetable oil. Call a doctor or poison prevention center immediately.
- Always wear safety glasses or goggles when working with batteries.
- Batteries generate hydrogen gas. Hydrogen gas is very explosive and can easily be ignited with a small spark or flame.
- Before working with batteries, stop the engine and turn the engine start switch to the OFF position.
- Avoid short-circuiting the battery terminals through accidental contact with metallic objects, such as tools, across the terminals.
- When removing or installing batteries, check which is the positive (+) terminal and the negative (-) terminal.
- Tighten battery caps securely.
- Tighten the battery terminals securely. Loose terminals can generate sparks and lead to an explosion.



Starting with jumper cables

- Always wear safety glasses or goggles when starting the machine with jumper cables.
- While jump starting with another machine, DO NOT allow the two machines to touch.
- Ensure the parking brake is applied on both machines.
- Ensure the size of the jumper cables and clips are suitable for the battery size. Inspect the cables and clips for any damage or corrosion.
- Ensure the engine start switch and both battery disconnect switches on the disabled machine are in the OFF position.
- Connect the batteries in parallel: positive to positive and negative to negative.
- Connect the positive (24VDC +) cable from the good machine to the (24VDC +) on the disabled machine first.
- Then connect the ground cable on the good machine to the frame of the disabled machine, as far away as possible from the batteries. This will prevent a spark from possibly starting a battery fire.
- Allow time for the batteries to charge.

NOTE: The batteries will charge even with the battery disconnect switches in the OFF position.

- If starting with a jumper cable, perform the operation with two people. One person in the cab of the disabled machine, the other person working with the jumper cables.
- If the batteries are low, DO NOT attempt starting the machine with only one set of jumper cables installed. Install the second set of jumper cables in the same way as already described.
- Turn the battery disconnect switches to the ON position and attempt starting.
- For jumper cable removal, disconnect the ground or negative (-) cable first, then the (24VDC +) cable last.
- If any tool touches between the positive (+) terminal and the chassis, it will cause sparks. Always use caution when using tools near the battery.

Jump starting with receptacles

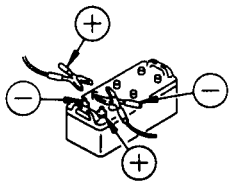
- Always wear safety glasses or goggles when starting the machine with jumper cables.
- While jump starting with another machine, DO NOT allow the two machines to touch.
- Ensure the parking brake is applied on both machines.
- Inspect the cables and connectors for any damage or corrosion.
- Ensure the engine start switch and both battery disconnect switches on the disabled machine are in the OFF position.
- Connect the jumper cable to the receptacle on the good machine to the receptacle on the disabled machine.
- Allow time for the batteries to charge.

NOTE: The batteries will charge even with the battery disconnect switches in the OFF position.

- If starting with a jumper cable, perform the operation with two people. One person in the cab of the disabled machine, the other person working with the jumper cables.
- If the batteries are low, DO NOT attempt starting the machine with only one set of jumper cables installed. Install the second set of jumper cables in the same way as already described.
- Turn the battery disconnect switches to the ON position and attempt starting.
- For jumper cable removal, disconnect the cables from each machine.

If any tool touches between the positive (+) terminal and the chassis, it will cause sparks. Always use caution when using tools near the battery.

INCORRECT



A030006

Precautions before performing service

Warning tag

Starting the engine or operating the controls while other personnel are performing maintenance on the truck can lead to serious injury and/or death. Always attach the warning tag to the control lever in the operator cab to alert others that you are working on the truck. Attach additional warning tags around the truck as necessary.

These tags are available from your Komatsu distributor. **Warning tag part number**: 09963-A1640

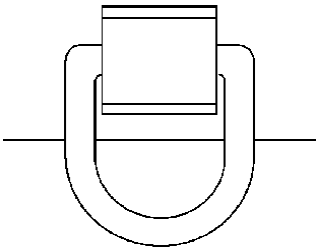
Stopping the engine

- Before performing inspections or maintenance, stop the truck on firm flat ground, lower the dump body, move the directional control lever to PARK, and stop the engine.
- If the engine must be run during service, such as when cleaning the radiator, the directional control lever must be in PARK. Always perform this work with two people. One person must sit in the operator's seat to stop the engine if necessary. During these situations, never move any controls that are not related to the task at hand.
- When servicing the truck, do not to touch any moving parts. Never wear loose clothing or jewelry.
- Put wheel blocks under the wheels to prevent truck movement.
- When performing service with the dump body raised, place the dump lever in the HOLD position and apply the lock (if equipped). Install the body-up safety sling securely.

Proper tools

Only use tools that are suited to the task. Using damaged, low quality, faulty or makeshift tools could cause personal injury.

Use of tie-off anchor during maintenance and repair



While working at heights during assembly, maintenance or repair of the haul truck, workers should wear an appropriate fall protection harness and attach it to a tie-off anchor or tie-off point.

Komatsu anchor (58B-98-75190) is available for use with fall protection harnesses. Carefully read and understand the harness maker's instructions before using any fall protection harness.

See Figure 00-1 and Figure 00-2 for acceptable welding areas.

NOTE: The anchor must not be used for lifting.

Table 2: Determining Anchor Mounting Area		
Dimension	**830E**	**930E**
A	1 980 mm (78 in.)	2 350 mm (93 in.)
B	550 mm (22 in.)	550 mm (22 in.)

Tie-off anchor installation

1. Remove paint for welding surface.
2. Weld the anchor using a 3 mm (0.12 in) fillet weld. The thinnest base metal is 2.65 mm (0.104 in.) thick.

NOTE: DO NOT weld the anchor on the bottom of a channel. The anchor must be welded on a side vertical wall of a channel or bolster. The anchor must be parallel to the channel or bolster.

3. Stick or MIG welding is used with a minimum of 490 MPa shield gas.
4. After welding, grind, sand, prime and paint to prevent corrosion. Paint color should be in accordance with local tie-off guidelines.
5. Anchors that are installed with this procedure must comply with OSHA standard 1910.66 APPC. The load carrying capacity of the anchor is 2 270 kg (5,000 lbs.).

NOTE: DO NOT use anchors for lifting.

NOTE: DO NOT weld anchors to the following components: Engine, alternator, frame, cab, radiator, tanks, cylinders, accumulators, brake cabinet, ladders, stairways, guard rails, retarding grid and blower, control cabinet, axles and suspensions.

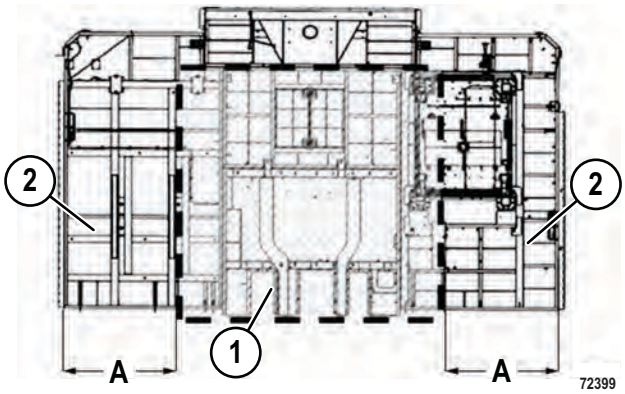


FIGURE 00-1. WELDING AREAS ON DECK

1. Acceptable Welding Area
2. Unacceptable Welding Area

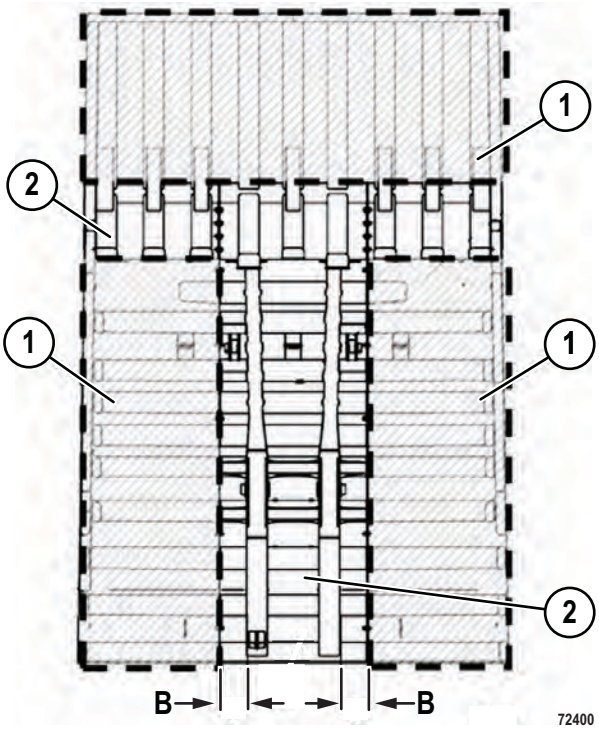


FIGURE 00-2. WELDING AREAS ON DUMP BODY

1. Acceptable Welding Area
2. Unacceptable Welding Area

Securing the dump body

⚠WARNING

To avoid serious personal injury or death, the body retention sling must be installed whenever personnel are required to perform maintenance on the truck while the dump body in the raised position.

The Komatsu body-up safety sling can only be used with a Komatsu body. Non-OEM body may not accommodate the Komatsu body-up safety sling. The end user must ensure that a proper cable/sling is used.

1. To hold the dump body in the up position, raise the body to its maximum height.
2. Install two shackles (2, Figure 00-3) and body retention sling (3) between rear body ear (1) and the axle housing.
3. Secure the shackle pins with cotter pins.
4. Move the hoist lever to the FLOAT position to slowly lower the body until the cable is supporting the full weight of the body. Then move the hoist lever to the HOLD position.
5. After service work is completed, return the sling to the stored position.

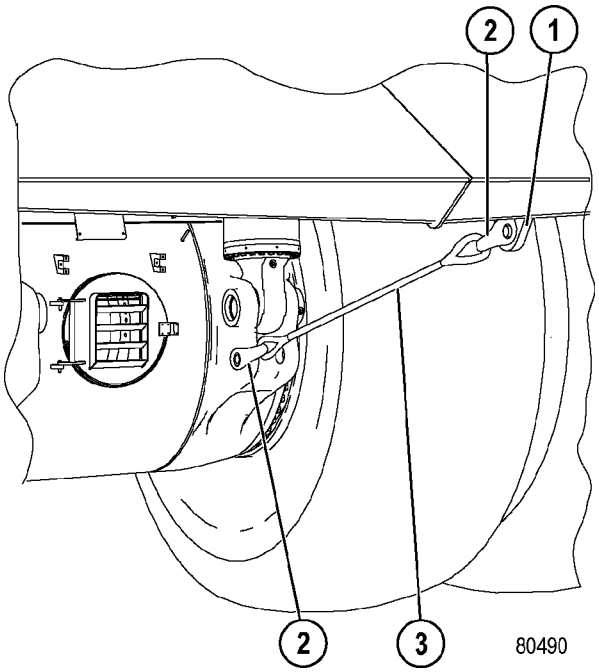


FIGURE 00-3. BODY RETENTION SLING INSTALLATION

1. Rear Body Ear
2. Shackle & Pin
3. Body Retention Sling

Jack point locations

When a truck is being stored for any period of time or being secured for maintenance work, portable jack stands or permanent jack stands may be used.

The jack stands must be adequately rated for the size of the truck. Ensure that the jack stands are on a solid and level surface.

Proper jack point locations must be used. The jacks at locations (3, Figure 00-4) must be located on the frame rails.

If a tow bumper reinforcement group is installed, it is acceptable to place jack stands under tow hooks at locations (4). However, do not position jacks outside of the tow hooks.

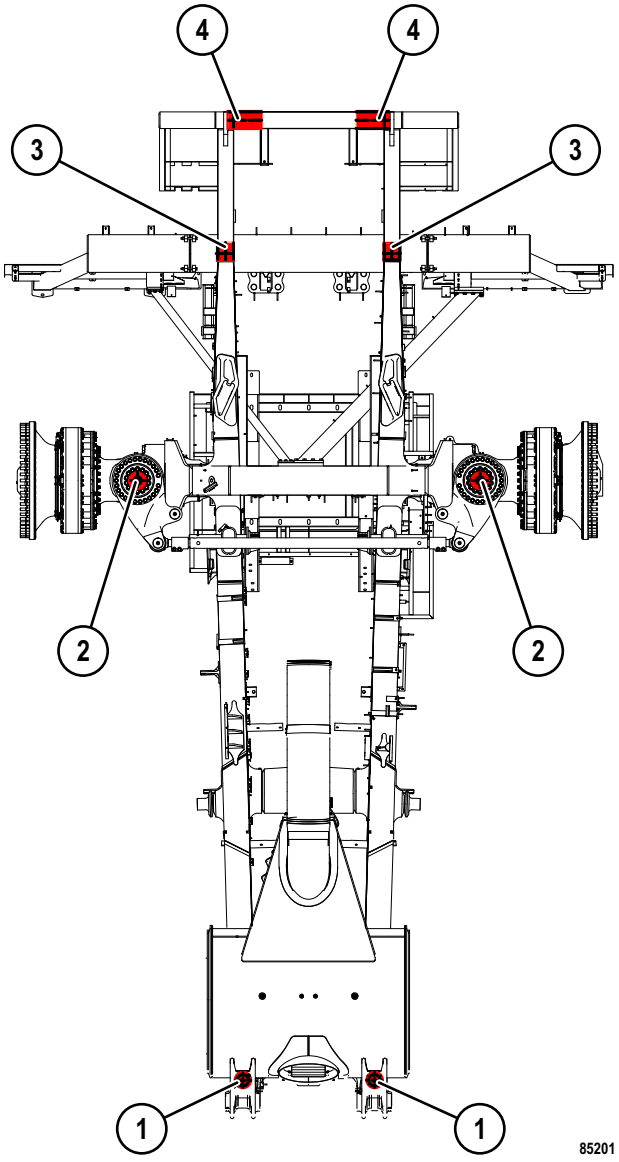


FIGURE 00-4. JACK POINT LOCATIONS
(Bottom View)

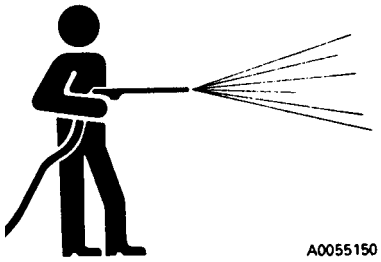
1. Under Rear Suspensions
2. Under Front Suspensions
3. Under Torque Tube
4. Under Tow Hooks (if equipped)

Precautions while performing service

NOTE: Only authorized personnel should service and repair the truck.

Keep the truck clean

- Spilled oil, grease, scattered tools, etc, can cause you to slip or trip. Always keep your truck clean and tidy.
- If water gets into the electrical system, there is danger that the truck may move unexpectedly and/or damage to components may occur. Do not use water or steam to clean any sensors, connectors or the inside of the operator's compartment.
- Use extreme care when washing the electrical control cabinet. Do not allow water to enter the control cabinet around the doors or vents. Do not allow any water to enter the cooling air inlet duct above the electrical control cabinet. If water enters the control cabinet through any opening or crevice, major damage to the electrical components is possible.
- Never spray water into the rear wheel electric motor covers. Damage to the wheel motor armatures may occur.
- Do not spray water into the retarding grids. Excess water in the retarding grids can cause a ground fault, which will prevent propulsion.


A0055150

Attachments

Place attachments that have been removed from the truck in a safe place and manner to prevent them from falling.


A0055130

Working under the truck

- Always lower all movable work equipment to the ground or to their lowest position before performing service or repairs under the truck.
- Always block the tires of the truck securely.
- Never work under the truck if the truck is poorly supported.


A0055140

Rotating fan and belts

Stay away from all rotating parts such as the radiator fan and fan belts. Serious bodily injury may result from direct or indirect contact with rotating parts and flying objects.


A0063830

Adding fuel or oil

- Spilled fuel and oil may cause slipping. Always clean up spills immediately.
- Always add fuel and oil in a well-ventilated area.
- When refueling, stop the engine and do not smoke.
- Tighten the cap of the fuel and oil fillers securely.
- Never use fuel to wash parts.

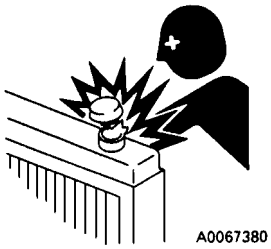
Use of lighting

When checking fuel, oil, coolant or battery electrolyte, always use lighting with anti-explosion specifications. If such lighting equipment is not used, there is danger of an explosion.


A0055160

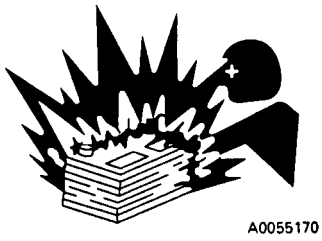
Radiator coolant level

If it is necessary to add coolant to the radiator, stop the engine and allow the engine and radiator to cool down before adding the coolant. Depress the pressure release button on the cap to vent cooling system pressure. Slowly loosen the cap to relieve any remaining pressure.



Precautions with the battery

When repairing the electrical system or performing electrical welding, remove the negative (-) terminal of the battery to stop the flow of current.



Precautions with high pressure oil

- Work equipment circuits are always under pressure. Do not add oil, drain oil or perform maintenance or inspections before completely releasing the internal pressure.
- Small, high-pressure pin hole leaks are extremely dangerous. A jet of high-pressure oil can pierce the skin and eyes. Always wear safety glasses and thick gloves. Use a piece of cardboard or a sheet of wood to check for oil leakage.
- If you are hit by a jet of high-pressure oil, consult a doctor immediately for medical attention.

Handling high pressure hoses

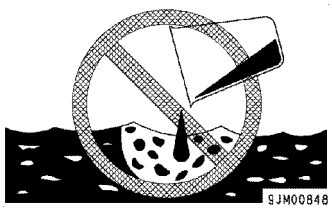
- Do not bend high pressure hoses or hit them with hard objects. Do not use any bent or cracked piping, tubes or hoses. They may burst during use.
- Always repair any loose or broken hoses. If fuel or oil leaks, it may result in a fire.

Precautions when performing maintenance near high temperature or high pressure

Immediately after stopping operation, engine coolant and operating oils are at high temperature and under high pressure. If the cap is removed, the oil or water is drained, or the filters are replaced under these conditions, it may result in burns or other injury. Wait for the temperature to cool and pressure to subside before performing the inspection and/or maintenance as outlined in the shop manual.

Waste materials

- Never dump oil into a sewer system, river, etc.
- Always put oil drained from your truck in appropriate containers. Never drain oil directly onto the ground.
- Obey appropriate laws and regulations when disposing of harmful objects such as oil, fuel, coolant, solvent, filters and batteries.
- The machine may be equipped with optional high intensity discharge lamps which contain mercury. These lamps must be reused, recycled or properly disposed of in accordance with applicable local, state and federal laws.



Tires

Inspection

The truck tires must be inspected and tire pressure must be checked with an accurate pressure gauge before each work shift and during tire rotations. Tire pressure will vary according to manufacturer and local working conditions. Consult the tire manufacturer for recommended tire pressure.

Ensure that the valve caps are securely applied to the valve stems. The caps protect the valves from dirt build up and damage. DO NOT bleed air from tires that are hot due to truck operation. Under such circumstances, it is normal for pressure to increase in the tire due to expansion.

A bent or damaged rim which does not support the bead properly may cause abnormal strain on the tire, resulting in tire damage. If a tire becomes deeply cut, it must be removed and repaired. Neglected cuts cause many tire problems. Water, sand, dirt and other foreign materials can get into the tire through a cut, eventually causing tread or ply separation.

Rim components that are deformed, bent, cracked, worn, corroded, or damaged must be clearly labeled to indicate their condition before they are discarded.

Maintenance

Rim and tire maintenance can be hazardous unless the correct procedures are followed by trained personnel. Tires that are improperly maintained or under/over-inflated can overheat and burst due to excessive pressure. Improper inflation can also result in cuts in the tire caused by sharp stones. Both of these conditions can lead to tire damage, serious personal injury, or even death. To safely maintain a tire:

- Before a tire is removed from a truck, the valve core must be partially removed to allow deflation. Then the tire/rim assembly can be removed.
- After the tire/rim assembly is installed on the truck, inflate the tires to their specified pressure. Abnormal heat is generated, particularly when the inflation pressure is too low.

NOTE: Any tire inflation pressures and permissible speeds given in this manual are general values. The actual values may differ, depending on the type of tire and the specific operating conditions. For details, consult the tire manufacturer.

Ensure that appropriate personal protective equipment is worn when servicing tires and rims.

⚠DANGER

When inflating and deflating tires, always use a safety cage. Never inflate a tire until the lock ring is securely in place. DO NOT stand in front of or over the lock ring during inflation procedures. Never over inflate a tire. Refer to tire manufacturer's recommendations.

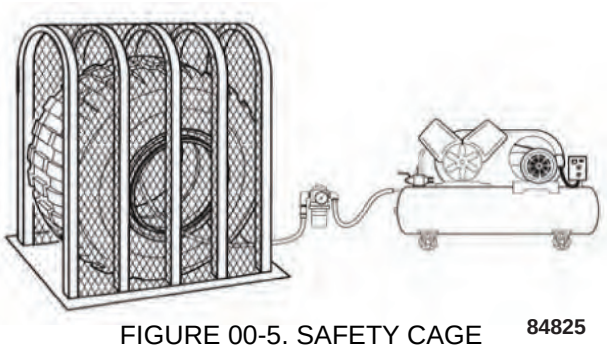
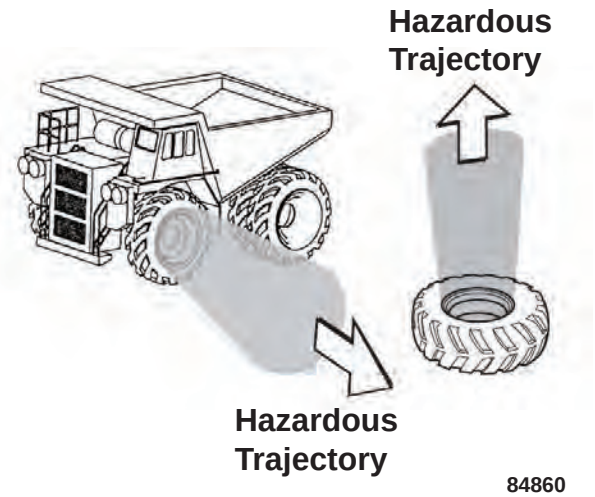


FIGURE 00-5. SAFETY CAGE 84825

⚠DANGER

Always keep personnel away from a wheel and tire assembly when it is being removed, installed, deflated or inflated. Personnel must always be outside the range of the "hazardous trajectory". Exercise extreme caution as the trajectory may widen.



84860

FIGURE 00-6. HAZARDOUS TRAJECTORY

⚠WARNING

DO NOT weld or apply heat on the rim assembly with the tire mounted on the rim. Remaining gases inside the tire may ignite causing explosion of tire and rim.

If a brake or wheel motor has experienced a fire, DO NOT go near the tire until the tire has cooled.

When the tires become overheated, a flammable gas is produced inside the tire which can ignite. It is particularly dangerous if the tires become overheated while the tires are pressurized. If the gas generated inside the tire ignites, the internal pressure will suddenly rise, and the tire will explode, resulting in danger and/or death to personnel in the area. Explosions differ from punctures or tire bursts because the destructive force of the explosion is extremely large. Therefore, the following operations are strictly prohibited when the tire is pressurized:

- Welding the rim
- Welding near the wheel or tire.
- Smoking or creating open flames

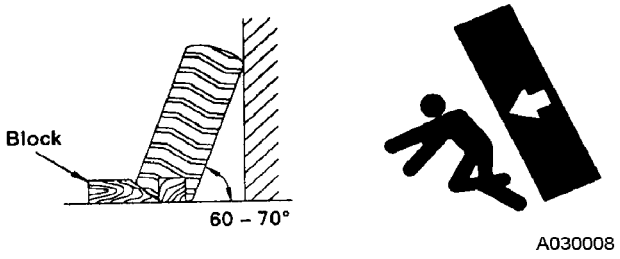
A005511

Storage

Tires must be stored indoors, if possible, in a cool, dry, dark, draft-free location. If stored outdoors, cover tires with a tarpaulin to keep out dirt, water and other foreign materials. Erect a fence around the tires and put up “No Entry” signs and other warning signs that even young children can understand. Long exposure to the sun will cause ozone cracks. Avoid contact with oil, grease and other petroleum products.

Tires must be stored vertically. Stand the tire on level ground and block it securely so that it cannot roll or fall over. If tires must be laid on their sides for a short period, avoid distortion by stacking no more than three tires on top of one another.

If the tire falls over, flee the area quickly. The tires for dump trucks are extremely heavy, and the impact from a significant fall could lead to an explosive separation of rim components. Never attempt to hold or support the tire. Attempting to hold or support a tire may lead to serious injury.



A030008

Mounted tires stored as spares must be inflated to minimum inflation pressure necessary to keep the tire beads properly seated. Maximum inflation pressure of the stored tire should never exceed 15% of the tire’s normal cold inflation pressure.

Before storing used tires, clean the tires thoroughly and inspect for damage. Repair as necessary. When a truck is placed in storage, it must be blocked up to remove the weight from the tires. If a stored truck cannot be blocked up, check the air pressure of the tires and inspect the tires twice a month for proper inflation pressure.

Handling

⚠WARNING

Ensure that the tire handling equipment is capable of lifting and maneuvering the load.

Due to the size and weight of the tire and rim assemblies, special handling equipment, such as a modified fork lift called a “tire handler”, as shown in Figure 00-8, is desirable. Consult local tire vendors for sources of equipment designed especially to remove, repair, and install large off-highway truck tires.

Handling of tires and rims must only be done by personnel who have received training and accreditation based on instruction from a qualified work supervisor.

There are several types of tools that are used for tire and rim handling. Ensure that the personnel have a proper understanding of how to use the tools properly.

When moving tires and rims, be careful to avoid accidental drops or falls that could injure others in the vicinity.

Regarding dual tire assemblies: DO NOT operate the truck with a single tire on a dual tire assembly. The load capacity of the tire and rim will be drastically reduced and may result in damage.

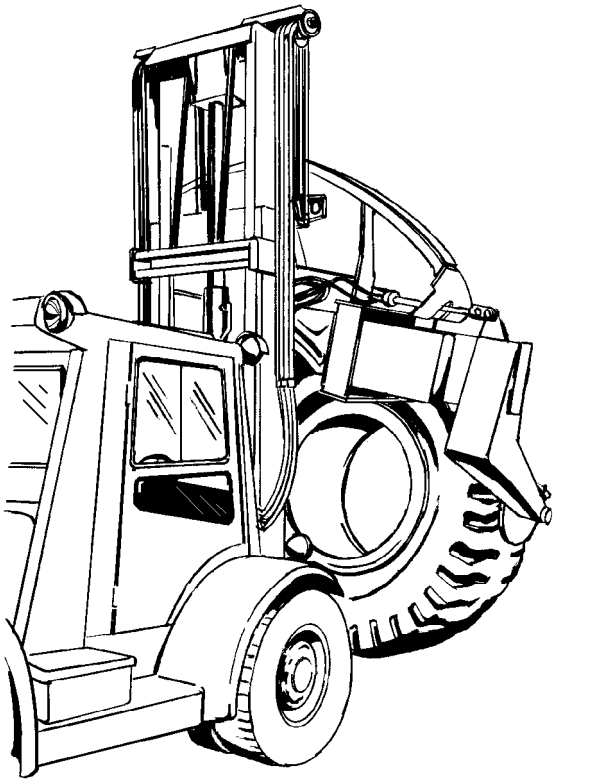


FIGURE 00-8. TYPICAL TIRE HANDLER